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Attorney Docket No. 70868/55581

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	M. Tanaka et al.	EXAMINER:	H. Nguyen
U.S. SERIAL NO.:	09/841,666	GROUP:	2871
FILED:	April 24, 2001		
FOR:	OPTICAL FILM, LIGHT REFLECTIVE FILM, LIQUID CRYSTAL DISPLAY PANEL, METHOD AND APPARATUS FOR PRODUCING AN OPTICAL FILM, METHOD OF PRODUCING A DIE ROLLER, AND METHOD AND APPARATUS FOR LAMINATING AN OPTICAL FILM		

CERTIFICATE OF FACSIMILE TRANSMISSION

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By: _____
Steven M. Jensen

Commissioner for Patents
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RESPONSE TO OFFICE ACTION

Sir:

Applicants appreciate the Examiner's thorough examination of the subject application and, further, request reconsideration of the subject application based on the following remarks.

Claims 1-12 are pending in the application. Claims 1-5 have been withdrawn from consideration as being drawn to a non-elected invention. Claims 6-9 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent 5,534,208 to Barr et al. (hereinafter "Barr"). This rejection is respectfully traversed.

With reference to claims 6-9, the Applicants' claimed invention is directed to an apparatus and method for producing an optical film, including a cylindrical die roller 105 having a matrix of concave or convex portions formed on a surface of the die roller (see specification at page 21, last paragraph to page 22, first paragraph; FIGS. 4 & 8). The concave or convex portions are formed in parallel rows 32 (see FIG. 8), and the die roller 105 is rotated to transfer a rough face 5 of the matrix to a photosensitive resin film 103 (see FIG. 4). As shown in FIG. 1, the rough face 5 of a die film 1 formed by the roller can include pyramidal convex portions 3 which are **inclined** at a predetermined angle with respect to a surface of the film (see page 21, first paragraph). Therefore, the die roller 105 depicted in FIG. 4 is formed with concave or convex portions which are inclined relative to the surface of the roller, in order to produce complimentary shapes on an optical film. In accordance with the Applicants' claimed invention, problems in the prior art such as the formation of moiré fringes are avoided.

The Barr reference is directed to a continuous rotary process for shaping the surface of foam pads, e.g., synthetic foam pads used in mattresses. With reference to FIG. 3, as cited in the Office Action, a die roller 12 includes raised portions/die elements 28 "with planar hexagonal end surfaces 26," which are arranged in a honeycomb pattern with a slot recess 50 spaced between adjacent elements 28 (see column 5, lines 24-31). As shown in greater detail in FIG. 4, each element 28 is shaped as a hexagon, with six sides that are "parallel to and spaced from a side 23 of an adjacent hexagonal element" (column 5, lines 31-33).

Barr fails to teach or suggest a cylindrical die roller having a matrix with a plurality of rows of concave portions or convex portions that are **inclined** with respect to a circumferential direction of the die roller. In Barr, the elements 28 arranged on die roller 12 have flat, hexagonally-shaped top portions and sides 23 which are parallel to each other, not inclined relative to the surface of the roller 12. In Barr, there is simply no teaching or suggestion of providing concave or convex portions which are **inclined** to avoid the formation of moiré fringes.

Moreover, Barr fails to teach or suggest transferring a rough face of a matrix to the surface of a film, which in the Applicants' invention can be a light reflective film for

a reflection type liquid crystal display (LCD) panel. In Barr, synthetic foam is pressed against the die roller, where the synthetic foam cannot be considered a "film," and certainly does not require the type of precision machining required to manufacture components of a liquid crystal panel, as taught in the Applicant's invention.

For at least the above reasons, Barr cannot anticipate or otherwise render obvious the Applicants' invention as recited in claims 6-9.

Claim 10 was rejected under 35 USC 102(b) as being anticipated by Japanese Publication 8-71801 to Takeda et al. (hereinafter "Takeda"). This rejection is respectfully traversed. For the Examiner's convenience, a computer translation obtained from the Japanese Patent Office (JPO) is attached to this response as Appendix A.

Claim 10 recites a method of producing a die roller, including steps of placing a tip end of a cutting tool on a surface of a cylindrical roller and reciprocating the cutting tool to form a row of concave portions, while at the same time moving the cutting tool in a direction parallel to the rotation axis of the roller. As shown in FIG. 5, a cutting tool 21 is reciprocated at a velocity V_Z and a cylindrical die roller 105 is rotated about rotation axis 23, while the cutting tool 21 also moves at a velocity V_X (see specification at page 24, last paragraph to page 25, first paragraph), thereby cutting the die roller 105. As shown in FIG. 8, the cutting tool 21 follows a predetermined pattern over the die roller 105 such that a plurality of pyramidal concave portions are formed, the concave portions being **inclined** at a predetermined angle (see FIG. 1 and discussion above).

Takeda relates to a method for cutting the rolls of a multiple-roll type rolling mill without removing the rolls from the rolling mill (see paragraph 1 of computer translation). As shown in FIG. 1 (cited in the Office Action), a cutting tool 13 is used to cut "the hole die of each roller" (see Abstract).

Takeda does not teach or suggest forming "a row of concave portions in the surface of the roller," as required in claim 10. Moreover, there is no teaching or suggestion in Takeda of forming any concave portions which are **inclined** with respect to a circumferential direction of the die roller. Therefore, Takeda cannot anticipate or otherwise render obvious the Applicants' claimed invention.

Claims 11 and 12 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent 4,911,096 to Munakata. This rejection is respectfully traversed.

With reference to claims 11 and 12, the Applicants' invention is directed to an apparatus and method for laminating an optical film on a substrate, including a stacked-member supply roller 122 (which corresponds to the "supplying means") for supplying a stacked member 141 including an optical film 140 and a die film, a pressing roller 125 for pressing the stacked member against a substrate 143, an exposing device 127 for bonding together the stacked member and the substrate 143, and a "stripping means" 126 for stripping the die film, in order to laminate the optical film 140 on the substrate 143 (see FIG. 10 and specification at pages 31-33). Claims 11 and 12 specifically require that the stacked member consist of an optical film and a die film having a rough face. As shown in FIG. 9, the die film 1 is formed with a rough face 5 which can include a plurality of pyramidal-shaped concave or convex portions (see FIG. 1 and discussion above).

Munakata, with reference to FIGS. 6A to 6C (as cited in the Office Action), teaches a method for manufacturing a mark indicator. As shown in FIG. 6A, a film member 12 with indicating layer 6 and colored layers 7 and 8 attached thereto is inserted into a molding die 10 and shaped in the pattern of projecting portion 11 (see, e.g., column 4, lines 29-67). Munakata fails to teach or suggest at least a stacked member consisting of an optical film and a die film having a **rough face**. In Munakata, the indicating layer 6 and/or colored layers 7 and 8 do not include a rough face, as taught in the Applicants' invention. On page 4 of the Office Action, it was stated that the "die film" corresponds to reference numeral 11 in Munakata. However, as discussed in Munakata, reference numeral 11 is a "projecting portion" of the molding die 10, and thus is used to shape film member 12.

In Munakata, the substrate 2 is shaped by a molding die 10 (see column 4, lines 29-36), whereas the Applicants' claimed invention relates to an apparatus and method of laminating an optical film onto a substrate from a stacked member consisting of an optical film and a die film stacked on a rough face of the optical film.

For at least the above reasons, Munakata cannot anticipate or otherwise render obvious the Applicants' claimed invention.

It is believed that the claims are now in condition for allowance. However, if there are any outstanding issues, the Examiner is urged to call the Applicants' representative at the telephone number listed below.

Applicants believe that additional fees are not required for consideration of the within response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,
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Intellectual Property Practice Group

Date: September 19, 2003

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APPENDIX A:
JPO COMPUTER TRANSLATION OF JAPANESE PUBLICATION 8-71801

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the cutting method and equipment which made it possible to cut without removing each roll of the multi-roll formula rolling mill which rolls out a wire rod and a steel bar from a rolling mill.

[0002]

[Description of the Prior Art] Although there are the 2 rolling method, the 3 rolling method, and the 4 rolling method in the sizing rolling method of a wire rod or a steel bar with the number of roll pairs used in one stand, as shown in (a) of drawing 8 , (b), and (c), in an all directions method, it has rolled out with two or more paths with the roll 3 which makes the pair which equipped the peripheral face 5 with the pass 6 of a predetermined cross-section configuration for Material M, changing the pressing-down direction

[0003] Although the 2 rolling method is adopted when the dimensional accuracy of a product generally manufactures what is not demanded so much, and the 4 rolling method currently indicated by JP,6-63601,A is adopted when manufacturing what close dimensional accuracy is required as Since the front face of the pass is worn out or after the roll of the rolling mill used for these rolling-out methods is used for rolling of a fixed period or a constant rate carries out surface deterioration of it, in order to carry out a reuse, it is usually cutting in the predetermined configuration.

[0004] Although cutting of this roll was demounting and cutting the roll from the rolling mill, while removal and anchoring of a roll also took the long time in that case, and it linked with the fall of productivity directly since rolling had to be suspended in the meantime and removal and anchoring of a roll took skill conventionally, a lot of people were needed and the work accompanied by risk was needed.

[0005] Precision rolling according [a means to cut the front face of the pass in the state / having attached the roll in a rolling mill / in view of such a point] to JP,63-237801,A or a reference "steel bar finish three-way-type roll It is indicated." (plastic-working symposium vol.139th, pgs 23-29, 1991)

[0006]

[Problem(s) to be Solved by the Invention] However, the cutting method of the roll shown in JP,63-237801,A While performing the horizontal position arrangement by

cutting the roll of 2 roll formula rolling mill which has the roll of a couple to a stand, and making the rolling mill removed from the rolling line push and fix to it with a pusher Although the backlash of this roll is lost and cutting is closed by preventing and carrying out rotational motion of the movement in the direction of a radial of a roll according to a radial pulley load mechanism, pressing a roll in the thrust direction of roll axis by the source of rotation power if possible Since the roll cut was not pressed towards a pass line, there was backlash of the roll of the direction of a pass line, and there was a problem referred to as that the variation in the cutting cost of a roll benefits this backlash large.
[0007] On the other hand, 26 pages of said reference "precision rolling with a steel bar finish three-way-type roll" and the thing shown in a view 5 Although the method which cuts the roll of 3 roll formula rolling mill, and was indicated by this is the method of carrying out the grinding of the pass of a roll, thrusting in the grinding stone (ring byte) of a cone instead of a rolled stock-ed among three rolls, and removing the backlash of a roll Since it was grinding, while there was a fault to which floor to floor time becomes long, there was a problem referred to as that grinding work takes skill by byte's own wear in order that a roll processing configuration may change.
[0008] Moreover, although it was thought that the above-mentioned roll cutting method was applicable also in 4 roll formula rolling mill, there was no publication to which it is supposed that a roll can be cut in the state [having attached the roll in a rolling mill], actually, was removed from the rolling mill and was performing cutting of each roll as usual.
[0009] It was originated in view of such a point, and this invention aims at offering the method and equipment which can be cut in the state [having attached each roll of a multi-roll formula rolling mill in a rolling mill].
[0010]
[Means for Solving the Problem] In the multi-roll formula rolling mill which constitutes a pass line where a peripheral face is approached in each peripheral faces of two or more rolls in which the pass was formed, as a method for that Remove outside the rolling mill which has the datum level prepared in the fixed position from the pass line from a rolling line that each roll should be cut in the state [having attached the roll in a rolling mill], and it fixes to a predetermined position. By contacting the touch sensor formed in the fixed position from the cutting byte of the cutting machine which can move in the direction of three dimensions (order, right and left, upper and lower sides) freely to the datum level of a rolling mill, we set up the working-standard point and decided to cut the pass of each roll from a cutting byte, respectively.
[0011] It is effective to attain a setup of a working-standard point by contacting a touch sensor to datum level and subsequently to the roll end face of each roll contacting it.
[0012] By turning each roll to a pass line and pressing it, it is good to cut, where it made the peripheral faces of each roll contact and the backlash of the thrust direction of the pivot of each roll and the direction of a pass line is abolished.
[0013] The base base which fixes to a predetermined position the rolling mill which has the datum level which formed outside the equipment which attains the above-mentioned method in the fixed position from the pass line, The cutting machine which has the touch sensor formed in the fixed position from the cutting byte who cuts each roll, and a cutting byte, The cutting machine was held and shell composition was carried out with order, right and left, the justification base that can move freely up and down, and the roll driving

source which grapples free [movement] and free [the attachment and detachment to the pivot of a roll] that a roll should be rotated at the time of cutting.
[0014] While contacting datum level in a touch sensor to the rolling mill which has the open section which allows datum level and the superficies which prepared this datum level the invasion to the roll end face of each roll, it is effective to invade into the open section and to make contact possible at a roll end face.
[0015] It is good to establish the press mechanism which turns each roll to a pass line and presses it, and it is convenient to abolish the backlash of each roll at the time of cutting of each roll if you make a press mechanism into the screw down device of a rolling mill in this case.
[0016] It is advantageous to constitute a touch sensor elastically.
[0017]
[Function] The method concerning this invention is explained below using the equipment concerning this invention. First, a multi-roll formula rolling mill is demounted from a rolling line, and it fixes to a base base, and the datum level in which the touch sensor of the cutting machine which was subsequently made to move in the justification base and was held at this justification base was formed by the superficies of a rolling mill is made to contact, and the working-standard point of each roll to a cutting byte is set up.
[0018] The justification base is moved to order, right and left, or the upper and lower sides, and a working-standard point is set up until a touch sensor contacts datum level, since a cutting byte can be located in a working-standard point to each roll by making a touch sensor contact datum level since the touch sensor is formed in the fixed position from a cutting byte while datum level is prepared in a fixed position from a pass line.
[0019] A setup of such a working-standard point is due to the following principles. That is, while an axial center is located on the single flat surface which the pivot of each roll attached in the rolling mill is supposed, it is held so that, as for the case of 2 roll formulas, the extension may cross [this axial center] at 60 degrees in parallel, respectively in the case of 3 roll formulas, and, as for the case of 4 roll formulas, the extension may intersect perpendicularly at a pan, respectively (refer to drawing 6).
[0020] Each roll which this is for making the direction of a pass line regularity, and was attached in the rolling mill serves as a point symmetry to the pass line, this pass line is the central point which was set as the rolling mill by the machine structure target and through which the charge of a rolled stock passes, and the center is located in the position which was fixed from the datum level prepared in rolling mill superficies.
[0021] Therefore, it is in the state which fixed the rolling mill removed from the rolling line with the posture which was fixed on the base base, and the working-standard point (or coordinate) of a cutting machine over each roll can be searched for by measuring correctly the position (coordinate) of X of the datum level of a rolling mill, Y, and a Z direction.
[0022] From the coordinate signal acquired by contacting a touch sensor to this datum level Apart from the technique of computing the position of a pass line directly and setting up a working-standard point, the setting technique of the working-standard point by the contact to the datum level of a touch sensor, and the contact to a roll end face From the coordinate signal acquired by contact of the touch sensor to datum level, the roll end-face position of each roll is computed. Based on this calculation result, a touch sensor is contacted to a roll end face, the position (coordinate) of an actual roll end face is

detected, the center position (actual pass line) of a roll mold cavity is computed from the position of this roll end face, and a working-standard point is set up.
[0023] Namely, if it is in a multi-roll formula rolling mill, since there is a variation rate in each roll on the anchoring machine structure of each roll in the thrust direction, Although the pass line on a rolling mill (pass line on a design) and the pass line (actual pass line) which is the center position of a roll pass may not necessarily agree As what the first technique does not have the gap with the pass line on this design, and an actual pass line, or can be disregarded The second technique sets up a working-standard point from the computed actual pass line in consideration of the inequality of the pass line on a design, and an actual pass line to setting up a working-standard point from the pass line on the computed design.
[0024] Next, just before or after the above-mentioned alignment process, it moves and a roll driving source is attached to the pivot of the roll which counters, and the pass of this roll is cut in a desired configuration from a cutting byte, rotating the roll which counters by this roll driving source.
[0025] Since it inserts each other in, there is inevitable shakiness in each, such as the section, and bearing, a bearing case, a pivot, and the state where each roll fell in the self-weight under the influence more slightly than a criteria position have each roll, when each roll is cut in the state [this having fallen], the process tolerance of a pass will fall.
[0026] In order to correct such a problem, in this invention, it supposes that it cuts in the state, i.e., the state where each roll was located in the criteria position, where turned each roll to the pass line, pressed it according to the press mechanism, and the peripheral faces of each roll were contacted slightly, and the pass was cut with a sufficient precision.
[0027] Moreover, in the equipment concerning this invention, if a touch sensor is set up elastically, while elongating in case processing positioning is performed and enabling contact to a roll end face other than the contact to datum level by invasion in the open section of a rolling mill, a touch sensor does not become obstructive [cutting] by making it retreat, in case cutting is performed after the completion of processing positioning.
[0028]
[Example] Drawing 1 shows the plan of one example corresponding to 4 roll formula rolling mill of this invention, and carries out the opposite position of the cutting machine 8 which performs the base base 7 which holds a rolling mill 1 on the processing base 17 of a plane, and cutting in this example with the posture in which the rear face of a rolling mill 1 and the front face of the cutting machine 8 become parallel.
[0029] Immobility is fixed on the processing base 17, and, therefore, a rolling mill 1 is formed by a rolling mill 1 being fixed to the base base 7 by immobility of the criteria support with which it is immobility and datum level 12 prepared in the back superficies of a rolling mill 1 in the case of the drawing 1 illustration example, and the base base 7 is formed after the opening periphery section of the back superficies of a rolling mill 1 has ******(ed) in the case of the drawing 5 illustration example.
[0030] Moreover, the touch sensor 14 formed in the cutting machine 8 countered the adjoining roll end face 4 of each roll 3, and provides in opening of the back superficies of a rolling mill 1 the four open sections 11 which invade in this opening and enable it to contact the roll end face 4 of each roll 3 so that clearly from drawing 5 .
[0031] The justification base 9 is [with the main rail 18 of the couple which runs to the cross direction arranged on the processing base 17, the sub rail 19 of the couple which

runs to a longitudinal direction, and the guide rail (not shown) arranged in the vertical direction] freely movable in each direction of right and left and the upper and lower sides with the power of each motor 21 approximately.

[0032] The cutting machine 8 is attached through the holddown member (not shown) on the sub rail 19, and it has formed the touch sensor 14 in the fixed position from this cutting byte 13 while making the cutting byte 13 project from the front face.

[0033] Although measurement of the working-standard point by the touch sensor 14 moves the cutting machine 8 to the fixed rolling mill 1, contacts a touch sensor 14 to datum level 12 and the roll end face 4 and attains it The contact to the roll end face 4 of a touch sensor 14 according to the operation based on the contact to the datum level 12 of a touch sensor 14 Compute the position of the roll end face 4 on a design, and according to this calculation result, move a touch sensor 14 to the cutting machine 8 and one automatically, it is made to invade into the open section 11 of a rolling mill 1, and the roll end face 4 is made to contact.

[0034] This cutting machine 8 is with [which is generally used] numerical-control equipment, by this, it may cut automatically the pass 6 of the peripheral face 5 of each roll 3 in a predetermined configuration, and may replace it with a touch sensor 14, and optical sensors, such as laser, may be used for it.

[0035] The roll driving source 10 which carries out the rotation drive of the roll 3 which made the pivot 15 perpendicular, and the roll driving source 10 which carries out the rotation drive of the roll 3 which leveled the pivot 15 are formed in the right-hand side of the processing base 17 so that it may be carried in a truck 20 and may become that movement is free and that the attachment and detachment to the pivot 15 of a roll 3 are free.

[0036] Moreover, the roll driving source 10 which carries out the rotation drive of the roll 3 which made the pivot 15 perpendicular is carried on a truck 20, and is installed also in the left-hand side of the processing base 17.

[0037] For example, in cutting the roll 3 which leveled the pivot 15, while the roll driving source 10 clinches the pivot 15 of this roll 3, transmitting the turning effort to a roll 3 and rotating a roll 3, in contact with the peripheral face 5 of this roll 3, in a pass 6, it is processed into a predetermined configuration, and after cutting completion secedes from a pivot 15, and returns the cutting byte 13 to a position.

[0038] Attachment and detachment of the roll driving source 10 to the pivot 15 of the roll 3 at the time of cutting of the pass 6 of the roll 3 which leveled the pivot 15 by this cutting byte 13 At for example, the nose of cam at which spline processing of the output shaft of the roll driving source 10 which prepared gear distributor shaft coupling of a male at the nose of cam of a pivot 15, and countered male gear distributor shaft coupling at the nose of cam of this pivot 15 was carried out Female gear distributor shaft coupling is prepared, the attitude variation rate of the female gear distributor shaft coupling is carried out according to the change of the hand of cut of the output shaft of the roll driving source 10, and it attains by making it detach and attach with male gear distributor shaft coupling.

[0039] the gear which similarly attachment and detachment of the roll driving source 10 to the pivot 15 of the roll 3 at the time of cutting of the pass 6 of the roll 3 which made perpendicular the pivot 15 by the cutting byte 13 attach the gear in each roll 3 in one, and was fixed at the nose of cam (soffit) of the output shaft of the motor of the roll driving

source 10 -- rise and fall of the roll driving source 10 -- it attains by engaging according to a variation rate

[0040] Although [this example] the backlash of each roll 3 is prevented and improvement in cutting precision is aimed at by turning the roll 3 of four to a pass line 2 at the time of cutting, pressing according to the press mechanism 16, and making peripheral face 5 comrades of each roll 3 contact lightly In this example, shakiness is canceled by contacting lightly mutually the peripheral face 5 which set the taper side 24 as 45 degrees (refer to drawing 3 and drawing 4).

[0041] Drawing 6 (a), drawing 6 (b), and drawing 6 (c) are what showed the state where the peripheral face 5 of each roll 3 in two roll mills, three roll mills, and four roll mills had touched slightly mutually, respectively. In the case of drawing 6 (a), it is the taper side 24 which has a stage, and, in the case of drawing 6 (b), the peripheral face 5 is the taper side 24 of 30 tilt angles, and, in the case of drawing 6 (c), it has become about the taper side 24 of 45 tilt angles.

[0042] As for the press mechanism 16, it is good to constitute using the screw down device of a rolling mill 1. for example, drawing 7 By the screw down device in 4 roll formula rolling mill applied to the steel bar of a minor diameter, this screw down device With a hydraulic motor 25, if a shaft 26 is rotated in the direction of arrow a, a shaft 28 will rotate in the direction of arrow b through a bevel gear 27, a shaft 30 will rotate in the direction of arrow c through a worm gear 29, and next, the eccentricity type bearing receptacle 32 rotates in the direction of arrow d by the spur gear 31 of a shaft 30.

[0043] Since while made perpendicular the axial center A and pivot 15 of the eccentric bearing receptacle 32 and the axial center B of the pivot 15 of a roll 3 is carrying out eccentricity at this time only in "delta" By rotation of the eccentric bearing receptacle 32, the axial center B 3 of a pivot 15, i.e., one roll Move in the roll 3 direction of another side which made the pivot 15 perpendicular, and the structure of the screw down device to the roll 3 of another side If it is constituted so that it may become symmetrical operation to one roll 3, and a shaft 26 is rotated in the direction of arrow a, the roll 3 of another side will move only the roll 3 and amount of said of one of these towards one roll 3, and a roll gap D will become small.

[0044] When using this screw down device as a press mechanism 16, in case a rolling mill 1 is removed from a rolling line, the press force of roll 3 comrades can be made regularity by separating a hydraulic motor 25 from a hydraulic pump (illustration abbreviation), and making rotation torque of a shaft 26 into fixed torque with a torque wrench. In addition, the press mechanism 16 is not limited to the screw down device of the rolling mill 1 shown in drawing 7 , and just makes the press force between roll 3 regularity.

[0045] Since this method can cancel the backlash of a roll 3 where a rolling state is reproduced mostly, it serves as a very effective means based actually.

[0046] In addition, if the bigger force a little as press force which presses each roll 3 than the AUW of a roll 3, bearing 22, a bearing case 23 or the eccentricity type bearing receptacle 32, and a pivot 15 is desirable and this press force is too large as for this According to the experiment which used the example which is because wear and deformation occur on a roll 3 by contact rotation of the ****** roll 3 and a process tolerance falls, and was shown in drawing 7 When it was press force about 1t or more which is the AUW of each roll 3, bearing 22, the eccentricity type bearing receptacle 32,

and a pivot 15, and the backlash of the roll 3 at the time of cutting was canceled and it cut by the press force which is 1.5t, cutting operation stabilized extremely was able to be obtained.

[0047] Moreover, it can join together and dissociate by shifting to a longitudinal direction, and also each is being fixed on the truck 20, and the source 10 of roll power has set up supply of the source of rotation power to the roll 3 which it is going to cut so that it may change freely.

[0048] Furthermore, in setting up a working-standard point by contact to the roll end face 4 of a touch sensor 14, the thickness dimensional accuracy of each roll 3 of a rolling mill 1 is managed severely, and this raises the center position of the pass 6 of a roll 3, i.e., the calculation precision of an actual pass line.

[0049]

[Effect of the Invention] Thus, after this invention performed alignment with the cutting byte of each roll by preparing datum level in the superficies of a multi-roll formula rolling mill, and contacting a touch sensor to the datum level, since [this invention] it cuts Since it can cut in the state [having attached each roll in a rolling mill], a lot of people and skill which are called removal and anchoring of a roll are therefore needed and the work accompanied by risk can be omitted, it contributes to improvement in the productivity in a rolling line, and safety greatly.

[0050] Since a calculation decision of the actual pass line which is the center position of a roll pass can be made and a working-standard point is set up by contact to the datum level of a touch sensor, and a roll end face according to this actual pass line, a very high cutting precision can be acquired.

[0051] Moreover, since a special backlash arrester is made unnecessary and it cuts in the state near at the time of rolling by contacting the peripheral faces of each roll lightly at the time of cutting, the process tolerance of a pass can be raised.

[0052] Furthermore, by making a touch sensor elastic, a roll etc. can be contacted in the case of cutting, the evil in which it becomes the obstacle of cutting can be prevented, and quick and smooth work can be enabled.

[Translation done.]

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Examining Group 2800

FAX NO.: 1-703-872-9318

FROM: Steven M. Jensen

FAX NO.: 617-439-4170

Our Docket No.: 55581 (70868)

No. of Pages (incl. cover): 13

Re: U.S. Serial Number 09/841,666

MESSAGE:

Please enter the attached Response to Office Action and Appendix A.